COMPUTER ABSTRACTS

VOLUME 23
1979

RECEIVED
APR 22 1980
U OF I LIB HLTH SCI

TECHNICAL INFORMATION COMPANY
P.O. BOX 59 · ST. HELIER
JERSEY · BRITISH CHANNEL ISLANDS

CLASSIFICATION SCHEME

Since the bulk of computer literature is concerned with digital computers, most sections of the classification relate wholly or primarily to various aspects of digital computers. However, for the benefit of readers chiefly interested in analogue computers, *all* material relating to such computers is classified in a single section (Section 15). Similarly, another section (Section 16) is devoted to *all* material relating to hybrid computers (and other computers not wholly analogue or wholly digital).

Applications of computers are classified in a special section (Section 18) subdivided into specific areas of application. Where appropriate, cross-references to this section are included in Sections 15 and 16.

Books (as opposed to articles and papers in periodical literature, reports and patents) are to be found in the final section (Section 19), but are appropriately cross-referenced in other sections.

The headings of the nineteen sections into which abstracts are classified are listed below with, for each section a description of its scope and/or examples of subject matter included in it. In addition references are given to other sections related in some respect to a particular section.

1 **GENERAL.** Covers matters of general interest and/or not falling within the scope of any other section. Includes:—State-of-the-art reviews; Directories and other reference material; General bibliographies; Terminology; Standardisation; Legal aspects of computers; Computer associations; Computing services; Economics of computer use; Marketing of computers; Computer selection; Planning, organisation, management, etc., of computer installations.

2 **COMPUTER THEORY.** Includes:—Automata theory; Formal languages (other than specific programming languages, for which see Section 8). Refer also to Section 3.

3 **LOGICAL DESIGN.** Covers the design of computer logic, unrelated to specific physical circuits or devices (for which see Section 10). Refer also to Sections 2 and 9.

4 **ARTIFICIAL INTELLIGENCE.** Includes:—Learning machines; Self-organising systems; Neuron analogues; Perceptrons; Simulation of human thinking.

5 **PATTERN RECOGNITION.** Includes:—Character recognition; Speech recognition; Pictorial features recognition.

6 **MATHEMATICS.** Covers all material having a high mathematical content. Refer also to Section 7.

7 **TECHNIQUES.** Includes:—Algorithms; Programs; Arithmetic operations; Arithmetic systems (such as interval arithmetic, residue arithmetic, etc.); Radix conversion; Sorting; Time-sharing. Refer also to Sections 6 and 8.

8 **PROGRAMMING.** Includes:—Languages; Operating systems; General programming techniques (but for specific production programs, see Section 7).

9 **SYSTEM DESIGN.** Covers the overall design, organisation and construction of digital computers, major parts thereof (e.g., arithmetic and control units), and multiple computer systems. Includes:—Application of digital computers in the design and production of digital computers. Refer also to Sections 2, 3 and 14.

10 **DIGITAL CIRCUITS AND COMPONENTS.** Includes:—Circuits and components for performing logic functions; Bistable and multistable circuits; Counters; Accumulators; Shift registers; Code converters; Adders; Subtractors; Multipliers; Dividers. Refer also to Section 11.

11 **DATA STORAGE.** Includes:—Memory elements; Memory matrices; Associative (content-addressable) memories; Permanent stores; Semi-permanent (read-only) stores; Magnetic recording (tape, drum, disc, card). Refer also to Section 12.

12 **INPUT/OUTPUT.** Covers peripheral equipment, its connection to and control by digital computers, and input/output techniques. Includes:—Punched tape; Punched cards; Printers; Display systems and devices; Speech output devices; Analogue/digital converters. Refer also to Sections 5, 11 and 13.

13 **DATA TRANSMISSION.** Includes:—Data acquisition and collection. Refer also to Section 12.

14 **SPECIFIC DIGITAL COMPUTERS.** Covers material relating to specific digital computer models (hardware and software). Includes:—Surveys of digital computer characteristics. Refer also to Section 9.

15 **ANALOGUE COMPUTERS.** Covers all material relating to analogue computers, and their components, analogue computing techniques, etc. Includes:—Applications of analogue computers (normally by cross-reference to Section 18).

16 **HYBRID AND OTHER COMPUTERS.** Covers all material relating to hybrid computers (and all other computers not wholly analogue or wholly digital), their components, hybrid computing techniques, etc. Includes:—Digital differential analysers; Applications of hybrid and other computers (normally by cross-reference to Section 18).

17 **EDUCATION AND PERSONNEL.** Includes:—Computer science education; Instructional aids; Films; Computer personnel recruitment, selection, training, etc.; Displacement of personnel and unemployment arising from the use of computers. Does *not* include educational applications of computers, for which see Section 18 (Education sub-heading).

18 **APPLICATIONS.** Differs from other Sections in that abstracts are further classified under sub-headings (in alphabetical order) for various specific areas of application (together with a final Miscellaneous sub-heading). The Contents page opposite includes a complete list of these sub-headings. Refer also to Sections 6, 7 and 8.

19 **BOOKS.** Includes:—Conference proceedings and the like.

CONTENTS

1 GENERAL 1 25 47 69 91 114 137 158 178 198 220 245
2 COMPUTER THEORY 2 25 49 70 92 115 138 159 179 198 221 246
3 LOGICAL DESIGN 3 26 50 71 93 116 138 159 180 199 222 247
4 ARTIFICIAL INTELLIGENCE 5 26 50 71 93 116 139 160 180 200 222 247
5 PATTERN RECOGNITION 5 27 50 72 93 116 139 160 180 200 223 248
6 MATHEMATICS 7 27 52 74 94 117 140 161 183 201 223 249
7 TECHNIQUES 9 29 52 75 96 119 141 164 184 203 225 250
8 PROGRAMMING 11 33 55 79 100 122 143 169 186 207 231 255
9 SYSTEM DESIGN 14 35 58 81 103 124 146 171 189 210 233 260
10 DIGITAL CIRCUITS AND COMPONENTS 15 36 60 82 105 125 149 172 191 210 235 261
11 DATA STORAGE 15 37 60 83 105 125 149 172 191 211 235 261
12 INPUT/OUTPUT 16 38 61 84 105 126 149 172 192 211 236 262
13 DATA TRANSMISSION 16 38 61 84 106 126 149 172 192 211 237 262
14 SPECIFIC DIGITAL COMPUTERS 16 38 61 84 106 127 154 173 192 212 237 262
15 ANALOGUE COMPUTERS 16 38 62 85 107 128 154 173 212 238 262
16 HYBRID AND OTHER COMPUTERS 16 39 85 107 128 154 173 193 212 238 262
17 EDUCATION AND PERSONNEL 17 39 62 85 107 128 154 173 193 212 238 263
18 APPLICATIONS
- Aerospace 17 39 63 85 107 128 154 173 193 213 238 263
- Business 17 39 63 85 107 129 154 173 193 213 238 264
- Chemical 18 39 64 86 109 129 174 213 238 264
- Communications 20 39 64 86 109 129 155 174 214 238 264
- Control—General Systems 20 40 86 109 130 155 193 214 239 265
- Control—Machine Tool 64 86 130 174 239 265
- Control—Production and Process 20 40 64 86 109 130 155 194 214 239 265
- Education 20 40 64 86 110 130 156 174 240 265
- Electronics 21 40 64 86 110 130 174 194 215 240 266
- Engineering, Civil 21 110 156 174 194 215 266
- Engineering, Electrical 21 40 65 87 110 131 156 174 194 215 240 266
- Engineering, Mechanical 21 41 65 87 110 131 174 195 216 241 267
- Engineering, Structural 41 65 87 110 131 156 174 195 216 268
- Information Retrieval 21 41 65 87 111 131 156 174 196 269
- Linguistics 21 42 65 87 156 196 216 241 269
- Medical 22 42 65 87 111 132 156 175 196 217 241 269
- Meteorology 23 43 66 111 242 269
- Military 23 43 66 88 111 133 156 176 196 217 242 270
- Mining 134 156 270
- Nuclear 43 89 111 134 156 176 196 217 242 270
- Physics 23 44 66 89 112 176 196 217 243 270
- Transport 44 66 89 112 134 156 176 196 217 243 271
- Miscellaneous 23 44 66 89 112 134 156 176 197 217 243 271

19 BOOKS 24 45 67 89 113 135 156 177 197 219 244 272

SUBJECT INDEX 273

AUTHOR INDEX 293

PATENT INDEX 307

LIST OF PERIODICALS ABSTRACTED 308

Abstracts are provided for four main types of items:

(1) Articles and papers in periodicals, conference proceedings, etc.
(2) U.S.Government Reports
(3) Patents
(4) Books

Abstracts of the first three types are arranged in the above order within each classified section of *Computer Abstracts*; book abstracts appear in a final section.

The publishers cannot supply copies of items abstracted, but will provide information if subscribers have difficulty in locating a source for any particular item. In most cases, however, the following notes should enable sources to be identified:—

Articles and papers. Titles of periodicals and other publications are generally abbreviated, but full titles and publishers are listed in the annual index. In the case of papers from proceedings of conferences and the like, full bibliographical details of the proceedings will normally be found in the Books section. A large proportion of the periodicals and other publications should be available in any good general technical library.

U.S. Government Reports. These reports relating to U.S. Government-sponsored research and development are mostly identified by AD, COM or PB serial numbers. Most reports are available from the National Technical Information Service, Springfield, Virginia 22151, U.S.A. Reports should be ordered by the serial number printed in italics in the abstract (*not* by the *Computer Abstracts* reference number). The price of a report depends on its length, on whether it is required in paper copy or microfiche form, and on whether the order originates in North America or elsewhere. In addition, prices are fixed for only a limited period of time. It is not therefore possible to quote a meaningful price in an abstract, and information about the price of any particular report should be requested from the National Technical Information Service.

Patents. British patent specifications are identified by *B.P.* followed by the serial number of the patent. They can be obtained at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY or by post from The Patent Office, Orpington, Kent BR5 3RD; in either case the price of a patent specification is 75p. U.S.A. patent specifications are identified by *U.S.P.* followed by the serial number of the patent; they can be ordered from the Commissioner of Patents, Washington, D.C. 20231, U.S.A., and cost 50 cents each.